

Progress Report for:

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**SYNTHETIC APERTURE RADAR SIGNAL PROCESSING AND IMAGING
USING HIGH PERFORMANCE COMPUTING**

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This document describes the progress on the work performed for "Synthetic Aperture Radar Signal Processing and Imaging Using High Performance Computing," under the DURIP Contract F49620-99-1-0140 for the Air Force Office of Scientific Research, for the period ending on 9/30/99.

The grant was provided by AFOSR to establish a SAR High Performance Laboratory. With this support, the following items were purchased for the SAR HPC laboratory:

1. 16 Origin-2000 300 MHz Processors
2. 8 GBytes of RAM
3. 108 GBytes of Fiber Channel Hard Drive
4. OCTANE Workstation with a 300 MHz RS-12000 Processor, and Enhanced SSE Graphics

During the past summer, the PI also collaborated with the members of the Air Force's Rome Laboratory (Contact: Mark Linderman) and Wright Patterson Laboratory (Steve Worrell, Ed Zelnio and Mike Bryant) on various implementation aspects of SAR signal and image processing algorithms on Shared Memory Processors (SMP) and Distributed Memory (DM) HPCs.

During the first part of the summer, the PI worked with the group at the Rome Lab. to work on the parallel implementation of his SAR imaging algorithms on HPCs. A subaperture digital spotlight SAR imaging method was developed that was suitable for implementation in both SMP and DM HPCs. The algorithm was tested using a wide-bandwidth and wide-beamwidth FOPEN SAR (P-3) database.

During the second part of the summer, the PI worked with the group at the Wright Pattern Lab. to implement his high-resolution SAR imaging (wavefront reconstruction) algorithms on realistic X band spotlight SAR databases. The subaperture digital spotlight SAR imaging method was successfully implemented for an operational wide angle spotlight SAR system.

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